Technological Forecasting & Social Change 192 (2023) 122553

Contents lists available at ScienceDirect

Technological Forecasting & Social Change

journal homepage: www.elsevier.com/locate/techfore

Social media engagement in the maritime industry during the pandemic

Le Yi Koh [a], Chloe Ng [a], Xueqin Wang [b], Kum Fai Yuen [a,*]

[a] School of Civil and Environmental Engineering, Nanyang Technological University, Singapore
[b] Department of International Logistics, Chung-Ang University, Seoul, Republic of Korea

ARTICLE INFO

Keywords:
Engagement
Social media
Protection Motivation Theory
Users Gratification Theory

ABSTRACT

The maritime sectors are suffering severe disruptions as a result of COVID-19. Maritime companies have turned to social media to interact with partners and clear up confusion. However, not every social media post receives the same engagement levels especially during a pandemic. For a more holistic analysis of social media engagement during a pandemic, the Protection Motivation Theory and classical theories such as user gratification and media richness theories were included. The research uses hierarchical regression analysis on information gathered from Facebook posts about COVID-19 made by eighteen different companies from four distinct maritime sectors. It was found that the rate of stakeholder engagement is highly influenced by informational, relational, and entertaining content as well as content that fosters self-efficacy, severity, and vulnerability. Additionally, the stakeholder engagement rate is greatly influenced by posts with greater vividness and fluency, which are characterized by providing external links. This is the first study to look into why stakeholders interact with posts linked to COVID-19 on social media. The findings will help maritime organisations use social media as a management and communication instrument.

1. Introduction

The outbreak of the Coronavirus disease 2019 (COVID-19) has led to over 400 million infections and over 5.2 million deaths globally as of December 6, 2021 (Hopkins, 2021). From an organisations' perspective, a crisis is defined as an incident that the management and stakeholders view to be extremely visible, unpredictable, and possibly disruptive (Bundy et al., 2017). Hence, COVID-19 is considered an organisational crisis because the spread of COVID-19 has led to devastating impacts, causing major operational disruptions to the maritime industry such as on matters concerning crewing (De Beukelaer, 2021), the supply of ships (UNCTAD, 2021a), port operations (UNCTAD, 2021b). Due to the global nature of the maritime industry, these devastating impacts of COVID-19 have implicated a plethora of key players within the maritime industry, including ports, container liners, bulk shipping, and ship management organisations.

Making matters worse, the hysteria surrounding the pandemic, exacerbated by fake news has heightened people's negative behavioural responses. This is due to the current social media (SM) landscape where misinformation and information overload constitute a substantial issue for organisations during the pandemic (Bermes, 2021). As a result, organisations must track the issues more frequently and respond quickly to the development of the pandemic. Despite these reservations, the benefits of using SM as a communication tool remain indispensable, as it allows for connectivity with nearly 80 % of the global consumer market (López et al., 2017). This is critical for organisations within the maritime industry as the global nature of maritime trade necessitates such connectivity. Furthermore, SM allows organisations to control the conversation narratives and respond quickly to stakeholders' sentiments, avoiding speculation and rumours which can potentially tarnish a company's reputation (Fraustino et al., 2012). In this study, stakeholders refer to those who have a silent or legitimate interest in the organisation. This includes internal stakeholders such as employees and managers, as well as external stakeholders such as industry partners i.e., suppliers and customers, society, shareholders, and the government. Additionally, SM enables organisations to communicate messages to stakeholders that are more personal, authentic, and direct resulting in a more caring, concerned, and committed representation of the organisation. Therefore, using SM will reduce misinformation and confusion, allowing for more effective responses during the pandemic and potentially reducing the negative effects of the events e.g., business threats that could lead to financial distress or bankruptcies and shortening the recovery time (Mair et al., 2016; Ritchie and Jiang, 2019).

However, SM's unparalleled speed and global reach as a

* Corresponding author.
E-mail address: kumfai.yuen@ntu.edu.sg (K.F. Yuen).

https://doi.org/10.1016/j.techfore.2023.122553
Received 23 April 2022; Received in revised form 6 March 2023; Accepted 26 March 2023
Available online 6 April 2023

communication tool can be a double-edged sword. By the same token, SM can hinder the organisation's communications during the pandemic by rapidly spreading misinformation, if the communication is not executed correctly (Holmes and Whitney, 2011). Instead, appropriate communication requires clear, consistent, and unequivocal messaging to keep incorrect information from spreading and heightening the hysteria (De Waele et al., 2017), especially during a pandemic. The usage of SM for communication can also be challenging because of the varying degrees of effectiveness in communications. This effectiveness is dependent on the posts' ability to garner substantial stakeholder engagement, where higher engagement levels such as 'likes', 'shares' or 'comments' increase the interaction and overall visibility of a post (Kang et al., 2021; Klassen et al., 2018), and the algorithm will subsequently promote the post to a wider network of stakeholders (Wagner et al., 2017). However, not all SM posts, in terms of content and characteristics, generate the same levels of stakeholder engagement (Schreiner et al., 2021), hence it is an apt time for to study which post contents and characteristics will engage stakeholders. This will be extremely useful to companies as they develop strategies to respond to the pandemic.

While there is numerous existing literature that examines the effects of the various types of SM contents that influence higher stakeholder engagement rates (Denktaş-Şakar and Sürücü, 2020; Surucu-Balci et al., 2020), these studies were limited to the evaluation of SM posts by organisation under usual business context. The existing literature has applied conventional communications theories such as the Users Gratification Theory (UGT) and the Media Richness Theory (MRT) to examine the effects on stakeholder engagement rates. However, the risks in the current COVID-19 pandemic may be catastrophic (Oxford, 2022), hence the characteristics of SM content types that would appeal to stakeholders under ordinary circumstances may differ significantly. In fact, the pandemic has vastly altered the lives of individuals and organisations, shifting worldviews and societies as people developed defensive behaviours in response to the arousal of anxiety and fear towards COVID-19 (Coelho et al., 2020). These circumstances highlight the critical changes in aspects of daily life and the social fabric of stakeholders, which can alter their priorities, and consequently the types of information that would appeal to them during a pandemic (Laguna et al., 2020). To the best of the author's knowledge, there is currently little study on how organisations may promote stakeholder involvement in SM in the context of COVID-19. Hence, this study will investigate stakeholders' engagement with shipping companies' COVID-19-related content on SM.

Additionally, with the existence of the circumstantial gap, there is a need to examine the types of content that would appeal to stakeholders in an event of a pandemic, which could benefit organisations in their response to the pandemic. This is an area that the conventional theories i.e., UGT and MRT do not address sufficiently. Hence, this study draws on Protection Motivation Theory (PMT), which is conventionally used to explain how people develop protection motivation against a health threat through coping and threat appraisals (Latkin et al., 2019; Sabzmakan et al., 2018). Accordingly, organisations could utilise positive and negative appeal eliciting messages which create an emotional response such as efficacy and fear. Such positive and negative emotional responses could raise the perceived coping and threat appraisals of stakeholders accordingly, which therefore creates a greater sense of motivation and urgency for them to engage with such SM content. Hence, PMT is essential in addressing SM engagement during the pandemic and this study will adopt these three theories i.e., UGT, MRT, and PMT to examine stakeholders' engagement with COVID-19-related content on shipping companies' SM.

Hence, motivated by the UGT, MRT and PMT, the objective of this study is to determine the types of SM posts in relation to COVID-19, which could influence higher stakeholder engagement for the purpose of effective crisis management. It adds to the existing UGT and MRT literature by going beyond the understanding of individual stakeholders' motivations for SM usage and the typical operational design of media content. Instead, it provides a more comprehensive analysis by incorporating concepts from the PMT allowing organisations to effectively harness SM as a management tool as opposed to a marketing communications platform to drive stakeholder engagement.

The rest of the paper is organised as follows. First, a model will be constructed by combining the concepts of UGT, MRT, and PMT, where a review of the current literature on these theories is conducted with respect to SM engagement. Thereafter, hypotheses were constructed. Subsequently, the stakeholder engagement rates were collected on specific Facebook pages of maritime organisations. Next, the data were analyzed, and hypotheses were tested using the linear regression hierarchical analysis. The results were presented and discussed. Lastly, conclusions are drawn and recommendations for future studies are considered.

2. Literature review

Stakeholder engagement refers to stakeholders' participation, and it is accomplished through an efficient communication strategy that promotes a symmetrical two-way dialogue between companies and stakeholders (De Luca et al., 2022). In recent years, driven by the quick growth of digital environments and a desire to forge personal connections with customers, companies are using SM to drive stakeholder engagement (Eigenraam et al., 2018; Meire et al., 2019). Consequently, managing companies' SM posts is considered a stakeholder engagement marketing strategy and brand management metric (Rietveld et al., 2020) because appealing brand pages and frequently updated brand postings are required to keep stakeholders interested and forge long-term working relationships with them (Wagner et al., 2017). Hence, it is not easy to engage stakeholders online (Utami et al., 2022). To measure a stakeholder's level of commitment to a brand during a specific consumer/brand interaction i.e., digital engagement, many studies used metrics such as "likes", "comments", and "shares" that the SM post receives (Kang et al., 2021; Onofrei et al., 2022; Vazquez, 2020; Yang et al., 2019). Yousaf et al. (2021) highlighted that stakeholders usually comment on SM posts to inquire about information or opinions. If the companies respond to these comments, there is a symmetrical two-way dialogue between companies and stakeholders i.e., stakeholder engagement and stakeholders will perceive the company to be interactive and feel encouraged to continue engaging and interacting with the brand (Bozkurt et al., 2021). Moreover, SM posts with information and suggestions also usually have higher shares and likes, leading to higher interaction (Yousaf et al., 2021). This indicates the post's communication effectiveness and also higher user interaction will further the post distribution on SM as the algorithm will serve the post to other SM users with an interest in the area (Wagner et al., 2017). Overall, stakeholder engagement adds value to companies by fostering self-brand connection, positive customer sentiment, brand loyalty, brand usage intention, brand referrals, and competitive advantage (Brodie et al., 2011; Hollebeek et al., 2014; Hollebeek et al., 2021; Meire et al., 2019; Onofrei et al., 2022; Ting et al., 2021), which are important for companies to survive and thrive in their respective industries.

This study adopts the Users Gratification Theory (UGT), Media Richness Theory (MRT), and Protection Motivation Theory (PMT) to determine the characteristics of different media types that would affect levels of engagement rates in SM. The assumptions, key variables, and application of each theory are presented in Table 1.

UGT is a communications theory that assumes that audiences play an active rather than passive role in the consumption of media to meet their needs (Tafesse, 2016) and has been employed to explain how users of digital media behave in various contexts (Mainolfi et al., 2022). It is relevant in the context of SM because users have the autonomy to choose which accounts to "follow", hence brands must align their posts' contents to the gratifications that stakeholders seek on SM. These gratifications are in the form of information, entertainment, validation, and social connection (Tafesse, 2016; Wagner et al., 2017) and this study

Table 1
Description of theories.

Theory characteristics	UGT	MRT	PMT
Assumptions	Assumes that individual choices of media and content to meet personal requirements impact stakeholder engagement.	Assumes that richer communication media have an impact on stakeholder engagement because richer media is often more effective than less rich media at communicating equivocal issues	The development of protection motivation against COVID-19 is dependent on threat and coping appraisal processes. Hence, adopted to understand the psychology of the development of threat and coping appraisal processes, relating to fear appeal and positive appeal eliciting messages respectively.
Representative variables	Informational, entertaining, and relational content	High and low media richness, influenced by the level of vividness and fluency of the message; dependent on the usage of hashtags, external links, and word length	Threat appraisal: Severity and Vulnerability. Coping appraisal: Self-efficacy and response efficacy
Application to model	Explains how individuals seek different forms of media to meet their own needs, and when needs are satisfied, it can lead to engagement.	Expresses that since media vary from low to high richness, the affecting levels of equivocal message influence engagement.	Explains how messages eliciting negative or positive emotions can lead to greater stakeholder engagement.

argues that well-fulfilled gratification needs can lead to higher SM engagement. Dolan et al. (2016) categorised social media content into information, entertainment, and relational content and posited that they influence favorably and unfavorably valenced engagement behaviour. Similarly, this study will refer to the framework proposed by Dolan et al. (2016) to examine SM engagement behaviours during the pandemic.

The purpose of communication, according to MRT, is to minimise uncertainty and ambiguity. According to this notion, different mediums have varying degrees of richness, where the richness of the medium is defined by the channel's ability to convey messages that communicate a varying amount of the message content. It is ranked in a hierarchy, with face-to-face communication being the richest, followed by video, voice, and text, and they can positively influence consumer engagement behaviours (Schreiner et al., 2021). As a result of considerable uncertainty and ambiguity in the information distribution process, the higher the media richness, the more successful information dissemination (Daft et al., 1987). Likewise, the degree of richness affects the fluency of the message, which is a critical element in communication. Communications should provide clear, consistent, and unequivocal messaging to reduce the effects of uncertainty, stress, and anxiety in crises (De Waele et al., 2017). By capitalizing on media-rich and interactive capability, companies can provide comprehensive brand experiences that satisfy consumers' innate desire for stimulation in the senses, emotions, and social life, leading to better responses from consumers (Tafesse, 2016). Hence, this study that media richness and its respective constructs i.e., the vividness of content and fluency of the message influences consumer engagement.

Developed by Rogers (1975) to be a cognitive model of behaviour, the goal of PMT is to predict (or mediate) behaviour that is linked to one's health. According to PMT, people who face hazards will take more precautions to safeguard themselves (Van Nguyen and Nguyen, 2022), and it has been applied to examine people's responses to natural disasters and digital security breaches (Oakley et al., 2020). PMT has been applied to examine hotel stay intentions (Hsieh et al., 2021) and vaccination hesitancy (Van Nguyen and Nguyen, 2022) during the pandemic. It is also applicable to the context of this study because people look to social media for the latest updates on COVID-19, and shipping companies' messages eliciting negative or positive emotions can lead to greater stakeholder engagement. Hence, it is worthwhile to use PMT to examine stakeholders' protection motivation behaviours against health threats.

Fig. 1 presents the theoretical model, which combines the UGT, MRT, and PMT to show their impact on the engagement rates of stakeholders.

2.1. Users Gratification Theory (UGT)

Fig. 1 shows the three main constructs of the UGT (i.e., informational, entertaining, and relational contents), and how they influence the level of stakeholder engagement. The catergorisation is based on Dolan et al. (2016) who applied UGT and classified the constructs into informational, entertaining, and relational contents to discuss their influence on social media engagement behaviours.

2.1.1. Influence of informational content on stakeholder engagement

In this study, informational content is defined as the extent to which SM material provides consumers with useful and resourceful knowledge that enables them to better understand the issue (Dolan et al., 2016; Rietveld et al., 2020). Based on past literature examining crises, information seeking and sharing are motivations for why SM followers and stakeholders use SM during a crisis such as natural disaster (Austin and Jin, 2016). Similarly, people may be encouraged to seek knowledge on severe problems that are spreading to obtain up-to-date information, such as the period of Cholera epidemics in Haiti (Sutter, 2010). 59 % of adult Americans (which constitutes 80 % of internet users) use social media to find health information (Fox, 2011), and this report suggests that people utilise online social tools to obtain information, exchange stories, and discuss issues. In the context of this study, the desire to seek company-related information in accordance with the developments of COVID-19 and how the company is managing the COVID-19 is considered as a motivation for users.

Examples of informational content in the context of this study include (1) celebratory news about the company's efforts against COVID-19 to strengthen its online presence on SM, (2) company news e.g., positive company information and the launch of new services in response to the pandemic (3) corporate social responsibility (CSR) news relating to COVID-19 so that shipping companies gain social legitimacy on SM (Bonsón and Ratkai, 2013a), and (4) post messages with a direct call-to-action (CTA) that prompts stakeholders to act on something such as reading up on news about COVID-19 by pressing on a link or interacting with other sources that they can attain additional information from or subscribing to the company's newsletters (Leek et al., 2019).

H1a. Celebratory messages lead to higher stakeholder engagement.

H1b. Company messages lead to higher stakeholder engagement.

H1c. CSR messages lead to higher stakeholder engagement.

H1d. Messages with CTA leads to higher stakeholder engagement.

2.1.2. Influence of entertaining content on stakeholder engagement

Entertaining content relates to how much enjoyment and entertainment people get from SM content, and its value stems from its ability to provide users with hedonic pleasure, escape, emotional release, and

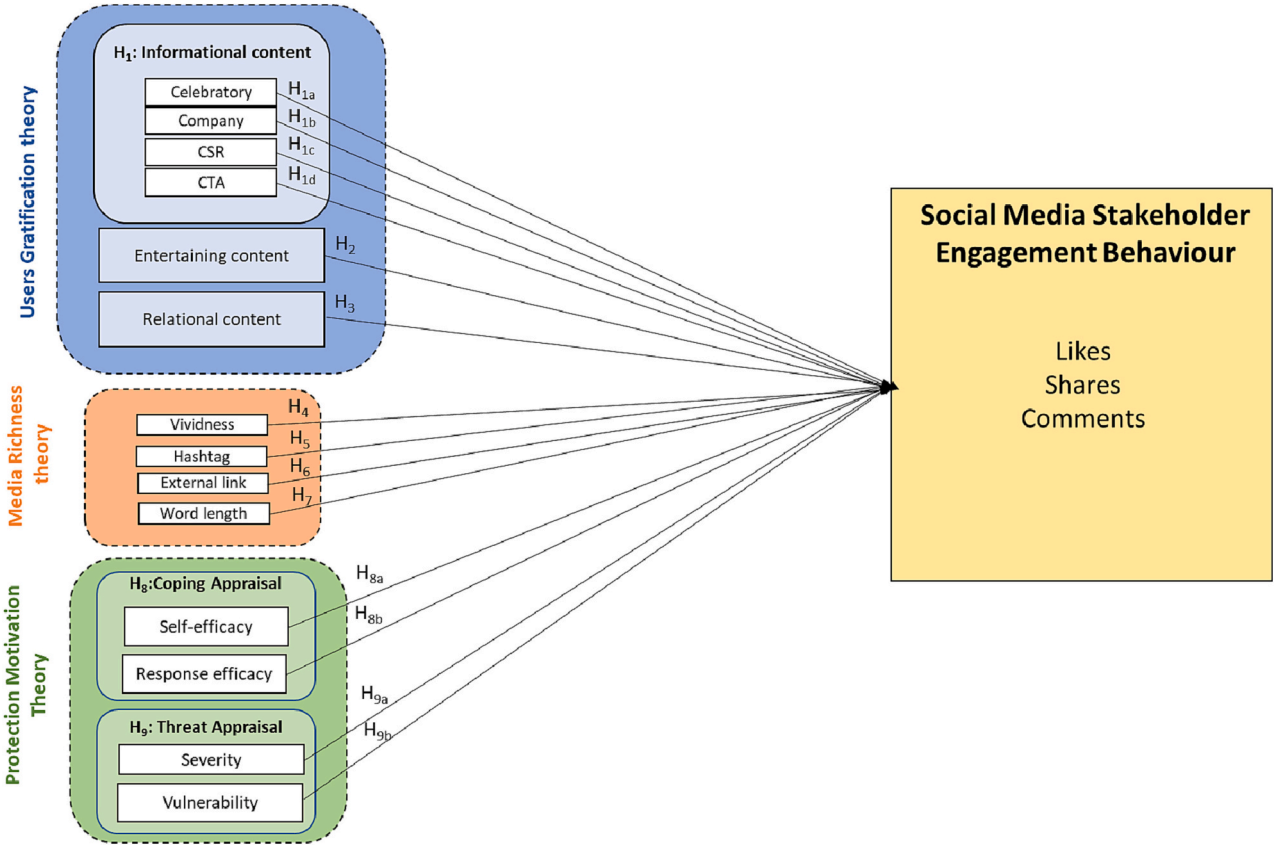

Fig. 1. Proposed theoretical model.

aesthetic pleasure (Dolan et al., 2016). The value of entertainment has been widely discussed in existing literature, with evidence presenting that entertaining advertisements drive positive attitudes towards advertisement (Taylor et al., 2011). Further, entertaining content such as video logs, story-telling, going behind-the-scenes, organised contests or challenges, and teambuilding events are shown to be important components in brand community participation (Raacke and Bonds-Raacke, 2008). Users may adopt humorous content more rapidly and share it, making postings with entertaining content more successful and engaging (Wagner et al., 2017). Hence the following hypothesis is proposed.

H2. Entertaining content leads to higher stakeholder engagement.

2.1.3. Influence of relational content on stakeholder engagement

UGT's relational construct relates to consumers' requirements for social contact and their desire to obtain social benefits, which have been recognized as major motives for internet users. Gaining a sense of belonging, connecting with friends, family, and society, and seeking assistance are examples of such goals (Dolan et al., 2016). Users find the internet to be a safe place to express themselves, share their perspectives, and share their experiences. Motivations for social engagement include meeting fascinating people, obtaining peer support, and feeling like you belong to a group or brand (Dolan et al., 2016; Harrigan et al., 2017).

The social interactive element of SM posts is proven to influence engagement as suggested by Kusumasondjaja (2018) who found that interactive brand posts garnered more frequent responses than other informative message contents. The research also found that Facebook as a platform worked better for interactive entertainment posts with mixed appeals as they received the most responses on Facebook. The concept of relatable content can be understood through the psychological state of consumers' experiences, where the relationships with branded digital content may be transferable to sharing intentions (Carlson et al., 2018).

Based on past literature on crisis, emotional support has also been found to be a motivation for SM followers to use SM in the event of a crisis (Austin and Jin, 2016). In the context of this study, organisations created relational content such as online quizzes or polls, open discussions, asking questions, sharing personal stories, sharing bite-sized tips, and showing solidarity support for individuals affected by COVID-19, which are examples of relational content that promotes social interaction among stakeholders. Hence, the following hypothesis has been constructed.

H3. Relational content leads to higher stakeholder engagement.

2.2. Media Richness Theory (MRT)

2.2.1. Vividness of content influences stakeholder engagement

MRT is applied to Social Networking Sites (SNS), where the term 'vividness' has been used in brand communication studies. It determines the richness of the company's posts which stimulates the users' senses (Fortin and Dholakia, 2005). For example, the vividness of a video is greater compared to a photo as it stimulates sight and hearing (Viglia et al., 2018), and can lead to higher engagement (Yousaf et al., 2021). Therefore, H_4 is proposed in Fig. 1.

H4. Content with higher vividness leads to higher stakeholder engagement rates.

2.2.2. Fluency of message influences stakeholder engagement

SM posts can contain various forms of multimedia characteristics that can enhance the post's ability to convey its intended message content. McShane et al. (2019) suggested that people favor fluent messages that make it easy to assimilate information because they are cognitively busy on social media. Hence the existence of hashtags, external links,

and the length of each post are characteristics that enhance the message's fluency. The goal of utilizing hashtags is to stimulate stakeholder engagement. As supported by Hays et al. (2012), hashtags create an online community by enabling users to interact with other users. Thus, H_5 to H_7 is proposed in Fig. 1.

Further, using hashtags improves the discoverability of a post (Hays et al., 2012), leading to the maximisation of engagement rates (Tiago et al., 2017). In parallel to this argument, Celuch (2021) examined how hashtags influenced engagement, but uncovered that the length of hashtags had a greater influence on users' engagement on Instagram. This is further supported by Dodson (2016) who claims shorter messages had greater user engagement. Hence, the following hypotheses are created.

H5. Content that includes hashtags or tagging others would lead to higher stakeholder engagement.

H6. Content that includes external links leads to higher stakeholder engagement.

H7. Posts with a shorter word length leads to higher stakeholder engagement.

2.3. Protection Motivation Theory (PMT)

PMT is a widely used framework in health-related literature to study the intentions and behaviours in the adoption of health-protective behaviours. PMT assumes that such adoption of protective behaviours against a health threat is dependent on the two distinct cognitive processes - coping and threat appraisal.

Threat appraisal relates to how threatened an individual feels with regard to the threat. Perceived severity and perceived vulnerability are two aspects of this belief that appraises threat. Perceived severity relates to a consumer's belief of the severity of the consequences of the threat whereas perceived vulnerability relates to the consumer's belief of susceptibility to the threat.

Coping appraisal relates to an individual's evaluation of several factors that are likely to ensure that one engages in health-protective behaviour. In which, self-efficacy and response efficacy are factors that affect coping appraisal. Self-efficacy deals with the belief that one has the capabilities to engage in protective behaviour in response to a threat. On the other hand, response efficacy relates to the belief that engagement with protective behaviour will reduce the threat. As such, the usage of PMT is widely accepted in health communications to prevent and discourage certain unhealthy behaviours such as tobacco use (Sabzmakan et al., 2018) and drug and alcohol abuse-related studies (Latkin et al., 2019).

However, PMT can also be used in other fields relating to communications and advertising to elucidate how people handle and make decisions under unpleasant or stressful life circumstances, such as a crisis. For instance, the rise in the number of major cyber-attacks in recent years has prompted studies towards the adoption of cyber security protection by firms, to reduce the threat of cyber-attacks (Stieglitz and Dang-Xuan, 2013).

Similarly, since the COVID-19 pandemic is a crisis, PMT can also be used to explain the individual's decision-making processes. Hence, in the application of this theory, this study proposes that people engage with posts that elicit high degrees of threat or efficacy. Incorporating a high degree of threat in messages is a form of negative appeal that creates negative emotional arousal such as fear and anxiety which could generate a sense of urgency for action to respond to the content, leading to stakeholder engagement. Similarly, content eliciting a high degree of efficacy such as confidence can be viewed as a form of positive appeal which motivates people to engage with the content, leading to stakeholder engagement. The former type of negative appeal eliciting messages focuses on raising the perceived threat level whereas the latter type of positive appeal eliciting messages focuses on raising the efficacy level.

2.3.1. Influence of positive appeal messages on stakeholder engagement

The application of positive appeal messaging is originally used in brand advertising to alleviate a person's anxiety and stresses about buying a product or service (Casais and Proença, 2021). The creation of positive appealing messages is achieved by describing the direct benefits as an incentive, known as gain-framed messaging. The effectiveness and preferences for positive appeal messages are well supported in existing communications and advertising literature (Mensa and Vargas-Bianchi, 2020). In this study, the effects of positive appeal messages can result in the subsequent generation of positive emotions which raises the coping appraisal of individual stakeholders, boosting their confidence and efficacy which are important emotional coping mechanisms under highly stressful and uncertain circumstances (Fredrickson, 2001). Positive emotional appeal messages have also been shown to receive support from the affected public in a crisis (Mayer, 2002). As well, existing literature such as Casais and Proença (2021) is consistent in supporting that positive appeal messages are effective in social marketing. Therefore, the positive emotional appeal aspect of self-efficacy and response efficacy eliciting messages on SM is effective in inducing stakeholder engagement response in a COVID-19 crisis. Thus, based on the above discussions, the following hypotheses are proposed:

H8a. Messages eliciting high self-efficacy influences stakeholder engagement.

H8b. Messages eliciting high response efficacy influences stakeholder engagement.

2.3.2. Influence of negative appeal messages on stakeholder engagement

Similar to the concept of positive appeal, the application of negative appeal messaging is commonly used in social marketing and advertising as a persuasive strategy that plays upon the consumers' anxieties and stresses on what they would lose by not purchasing a product or service (Casais and Proença, 2021). The creation of negative appealing messages is achieved by describing the losses of certain behaviours, known as loss-framed messaging. In this study, the effects of negative appeal messages could also generate a negative emotional response such as discomfort, panic, remorse, or shame that leads to the incentivization of certain behavioural changes. This arousal of negative emotional responses could raise the threat appraisal of individual stakeholders, through their perceptions of higher severity and vulnerability towards the threat of COVID-19. Numerous existing literature such as Zheng (2020), supports this theory that negative emotional appeal messages are effective in generating a response in social marketing. Therefore, the negative appeal aspects of severity and vulnerability eliciting messages on SM are effective in inducing stakeholder engagement response in a COVID-19 crisis.

H9a. Messages eliciting severity have a positive impact on stakeholder engagement.

H9b. Messages eliciting vulnerability have a positive impact on stakeholder engagement.

3. Methodology

This paper has examined three theories i.e., UGT, MRT, and PMT, and hierarchical regression is utilised to test out the theories in a stepwise fashion. The purpose is to introduce variables from theories that have been well established in the literature (i.e., UGT & MRT), before introducing variables from PMT which is the novelty of this study. This method of introducing the variables into the regression model shows whether the new theory (i.e., PMT) complements classical theories (i.e., UGT and MRT) in explaining stakeholder engagement. This section explains the sampling, data collection, and the variables used in the analysis and method used.

3.1. Sampling and data collection

In today's SM landscape, there exist numerous SM platforms, for example, Facebook, Twitter, and LinkedIn. However, Facebook as a platform was chosen for this study, as it is the most influential SM platform today. It has over 2 billion active users, while Twitter and LinkedIn have just 206 million and 690 million respectively. Facebook's global reach allows businesses the potential to reach over 25 % of the world's population (Leighton, 2021), and is still the most widely used SM platform for B2B and B2C marketers worldwide (Stelzner, 2018).

This study focuses on several sectors within the maritime industry that have been severely impacted by the pandemic as they are heavily dependent on the labour of 'key workers' such as seafarers and port workers. The term 'key workers' is used during the pandemic to define employees who are providing "essential services". This study's sample included companies from container and bulk shipping, ports, and ship management sectors. The top 5 companies within these sectors were selected as representative of the types of content posted on SM during COVID-19. However, the Top 5 Container Liners excluded companies without official Facebook pages, the next company in-line was used. Only three Dry Bulk companies were chosen as the rest were deemed unsuitable for data collection, they either did not have an official Facebook page, were inactive, or had less than five COVID-19-related posts in a year. As for the port sector, many Chinese ports that did not have an account were excluded, other ports like Antwerp and Rotterdam had a significant number of posts in languages other than English, hence were also excluded, and the next in rank was used. The Facebook posts from these 18 companies were manually collected from the period of 1st January 2020 to 31st July 2021. To filter out all the posts relating to COVID-19, all the posts made by companies were searched using the keywords such as "COVID-19", "Pandemic", and "Corona". 431 posts were gathered in total, and the breakdown of posts collected from container liners, dry bulk companies, ship management companies, and ports is shown in Table 2.

Among the container liners, 18 Facebook posts from Mediterranean Shipping Co, 66 posts from Maersk, 7 posts from COSCO, 26 posts from CMA CGM, and 20 posts from Hapag-Lloyd were collected and analyzed. Next, the Facebook posts from dry bulk companies i.e., Norden, Pacific Basin, and Eagle Bulk were also collected. This consists of 8 posts from Norden, 8 posts from Pacific Basin, and 10 from Eagle Bulk. Among the ship management companies, 37 were from Anglo-eastern management, 66 from V.ships, 26 from Fleet management, 50 from BSM, and 19 from Columbia ship management. Lastly, Facebook posts of ports were also collected. 34 posts from the port of Singapore were analyzed, as well as 14 from the port of Dubai, 10 from the port of LA, 5 from the port of Hamburg, and 7 from the port of Tanjong Pelepas.

Table 2
Selected companies by sector and their respective number of followers.

	Number of followers (as of 14th September 2022)	Facebook posts analyzed
Container liners[a]		
Mediterranean Shipping Co	52,692	18
APM- Maersk	3,077,265	66
COSCO Group	29,973	7
CMA CGM Group	173,387	26
Hapag-Lloyd	130,807	20
Dry Bulk Companies[b]		
DS Norden	14,032	8
Pacific Basin	10,925	8
Eagle Bulk	4409	10
Ship Management Companies[c]		
Anglo-eastern Management	18,501	37
V.ships Group	33,310	66
Fleet Management	8852	26
Bernhard Schulte Shipmanagement (BSM)	6962	50
Columbia Shipmanagement	21,775	19
Ports[d]		
Port of Singapore	20,527	34
Port of Dubai	405,727	14
Port of LA	36,125	10
Port of Hamburg	479	5
Port of Tanjong Pelapas	17,140	7

[a] The top 5 Containers Liners were based on The Alphaliners Top 100 list as of 2021, measurements were based on the total number of twenty-foot equivalent units (TEUs) on the Trans-Atlantic, Trans-Pacific, and Fareast-Europe trades in a year (Alphaliner, 2021).

[b] The top 5 Dry Bulk companies were based on The Vesselindex Performance Report which measures the Time Charter Equivalent (TCE) performance of Dry Bulk companies according to the earning potential of existing fleets (HellenicShipping, 2021).

[c] The top 5 Ship Management Companies were based on The Lloyd's List Top 10 ship managers 2021, measurements were based on the full technical management, fleet size, and the number of crew (Lloyd'sList, 2021b).

[d] The top 5 Ports were based on Lloyd's List of Top 100 ports as of 2021 and measurements were based on the total number of TEUs handled in a year (Lloyd'sList, 2021a).

3.2. Data coding

3.2.1. Independent variables

A total of seven independent variables were used to measure the constructs of UGT i.e., informational, entertaining, and relational contents derived from Dolan et al. (2016). There are five measures for informational content type consisting of "Celebratory news", "Company news", "CSR news" and "CTA" with the addition of information sources. Where, "Celebratory news" relates to news that honours the achievement of results or performances during the pandemic despite the challenges faced e.g., social distancing, isolation measures, and market volatility, "Company news" relates to any information regarding the company's activities, functions, or services in response to the pandemic, "CSR news" relates any activities of charitable nature for societal good and "CTA" represents posts that had a direct call-to-action and included additional informational sources.

All the variables were coded according to two categories, yes for those that had such content and no for those that did not have such content. CTA posts were coded as yes when it had phrases such as "Click here for more information", "Read more here", "Find out more information here", or when the post either provided a link or stated the source for the additional information. Entertaining content provides social media users with fun, hedonic pleasure, escapism, emotional release and aesthetic enjoyment (Dolan et al., 2016). Hence, entertaining company-curated content such as video logs, organised competitions, and teambuilding events that feature employees participating may pique social media users' curiosity and interest because they may find these contents entertaining. Relational content facilitates two-way interactions that allow the company and stakeholders to form a bond. This requires interaction and can be conducted through online quizzes or polls, discussion forums, or other posts pledging solidarity and support to those affected by COVID-19.

The MRT construct that measures the fluency of a message consists of four independent variables, vividness, hashtag usage, external link, and word length. Vividness level consists of three categories, "low" level representing a post with only texts, "medium" level for posts with at least one image, and "high" level for posts that includes a video or gif were coded as high vividness. The "word length" of a post is a metric variable, where the number of words in each post was measured. "Hashtag" usage is another categorical variable with two outcomes (i.e. yes or no). The inclusion of "external links" in posts was also coded under "yes" for posts that were embedded with a link and "no" for those without it.

There are four independent variables under PMT; self-efficacy, response efficacy, severity, and vulnerability. The categorisation of PMT variables was individually assessed and identified through understanding the factors that affect positive and negative appeal messaging in the respective coping and threat appraisal process,

(1) Self-efficacy according to Bandura (1977), has four informational sources from which a person strives to determine the effectiveness of their actions: performance outcomes, vicarious experiences, verbal persuasion, and phycological feedback. Hence, keywords that elicit the meaning of 'efficacy' which increases the competency in performance outcomes are listed in Table 3. Similarly, shared experience of 'success' drives self-efficacy, and keywords that elicit the meaning of 'success' were identified. Verbal persuasion by encouragement directly affects self-efficacy hence keywords that elicit the meaning of 'encouragement' were identified. Lastly, since positive emotional arousal caused by psychological feedback increases self-efficacy, keywords that elicit the meaning of 'positive' were identified.
(2) Response efficacy in the case of COVID-19, relates to the effectiveness of the WHO recommended protective measures against the spread of COVID-19, namely, the wearing of facial masks, maintaining personal hygiene, social distancing, and getting COVID-19 vaccinations (WHO, 2020). Hence, posts eliciting response efficacy towards COVID-19 were identified by using keywords that promote the use of COVID-19 protective measures, with direct mentions of such measures. The keywords are listed in Table 3.

Table 3
PMT variables influencing engagement.

Variables	Keywords
(1) Self-efficacy	
a. Efficacy	Adequate, Adequacy, Ability, Able, Capability, Capacity, Capableness, Competent, Competence, Compelling, Useful, Helpful, Positive, Powerful, Potency, Valid, Effectual, Efficacious, Effective, Effectiveness, Strength, Success, Sufficiency
b. Success	Accomplishment, Achievement, Advance, Benefit, Boom, Gain, Progress, Realisation, Triumph, Victory, win, Attainment, Successfulness
c. Encouragement	Assistance, Cheer, Comfort, Confidence, Consolation, Incentive, Inspiration, Optimism, Reassurance, Reassuring, Relief, Relieving, Reward, Stimulation, Stimulus, Advance, Aid, Boost, Helpfulness, Hope, Supporting, Consoling,
d. Positive	Clear, Conclusive, Decisive, Direct, Specific, Absolute, Affirmative, Concrete, Firm, Perfect, Actual, Inarguable, Happiness, Real, Restore, Undeniable
(2) Response efficacy	Face masks, Facial Masks, Masks, Surgical Masks, N95 respirators, Face shields, Barrier Face Coverings, wash hands, washed, hand washing, Gloves, Personal Protective Effective (PPE), hygiene, hygienic, clean, social distancing, physical distancing, keep a safe distance, safe distancing, work-from-home, stay home, vaccination, vaccines, booster, Pfizer-BioNTech, Moderna, medicine, get vaccinated, well-ventilated spaces, protects you, precautioned measures
(3) Severity	Harsh, Harshness, Serious, Severe, Strenuous, Escalating, Grave, Hard, Arduous, Tough, Challenging, Demanding, Difficile, Burdensome, Crucial, Critical, Problematic, Laborious, Onerous, Troublesome, Exhausting, Uphill, Painful, Punishing, Taxing, Gruelling, Exacting, Rigorous, Trying, Painstaking, Unsparing, Problem, Upstream, Wearisome, Immense, Toilsome, Operose, Death rate, Mortality rate, Hospitalisation, Fatality, Oxygen, Ventilator, Respirators
(4) Vulnerability	Susceptibility, Susceptible, Communicable, Contagious, Defenceless, Exposed, Unprotected, Unsafe, Weak, Assailable, Helpless, Unarmed, Endangered, Infectious, Infective, Virulent, Transferable, Transmittable, Transmission, Vitiating, Proliferation, Public Health Emergency, Case numbers, Newly infected cases

(3) Severity refers to the degree of consequences for an individual for not exhibiting the protective measures against COVID-19. Here, such consequences could relate to the degree of harm to an individual or the company. This is linked to the effects of negative appeal messages discussed previously. Further, posts that emphasises on the degree of severity or negative consequences of the pandemic heighten the perception of severity. Hence, posts that elicit high severity are identified through the keywords listed in Table 3.

Additionally, posts that reported the number of COVID-19-related deaths also elicit a high perception of severity as it sparks fear. COVID-19 is commonly mild and self-limiting but can be severe and fatal. In severe cases, patients require hospitalisation, and supportive care such as oxygen, ventilators, and respirators (WHO, 2022) were listed in Table 3.

(4) Vulnerability refers to an individual's belief in the susceptibility to contracting COVID-19. The frequency and speed of COVID-19 cases are used to gauge exposure risk (Cartaxo et al., 2021). Hence, the identification of posts eliciting vulnerability included those which mention case numbers. Keywords used in the identification process conveyed the meaning of 'vulnerability' relating to the susceptibility, or the ease of being transmitted. Keywords are presented in Table 3.

To the best of the authors' knowledge, there were no journal papers that can be referred to for the keywords as PMT is a new theory. Hence, the keywords were defined based on the authors' judgment and face validity. The list of keywords was identified using the Thesaurus Dictionary to include the synonyms. Two authors discussed the keywords to ensure consensus. If there were differences, the third author will decide whether to add the keyword to the pool. Additionally, if new potential keywords are found while analysing the posts and they are not in our pool, the authors will discuss them again and decide whether that keyword should be added to the pool. The keywords for each variable are presented in Table 3. The measurement of independent variables was performed manually, and all authors participated in the evaluation of the 431 Facebook posts. The posts were evaluated by two authors independently and subsequently cross-validated. If there are differences in the evaluations, the third author will evaluate and decide which is better.

3.2.1.1. Measurement of PMT variables. PMT variables are metric variables, as some identified posts contained more than one keyword. Moreover, since word length is suggested to affect stakeholder engagement, a formula was derived which expresses the number of keywords present in the posts as a fraction of the total number of words in the post. The resultant value would represent the self-efficacy, response efficacy, severity, and vulnerability scores, leading to engagement.

$$PMT\ score = \frac{Number\ of\ keywords}{Total\ word\ length\ of\ post}$$

3.2.2. Dependent variables

The dependent variable in the regression analysis is the stakeholder engagement rate. A formula that was derived by Bonsón and Ratkai (2013b) and Bonsón et al. (2016) was used to calculate the stakeholder engagement rate for Facebook. As shown in Table 4, the number of interactions which are "likes", "comments" and "shares" are needed for the calculation of the engagement rate. Hence for each post, the respective number of "likes", "comments" and "shares" were collected.

After collecting the data on the number of likes, shares, and comments the *average number of likes per post (P1), the average number of comments per post (C1), and the average number of shares per post (V1),* were collected accordingly. *P1* was derived by dividing the total likes by

Table 4
Formulas used in the calculation of stakeholder engagement rate.

Name	Formula	Measures
Popularity		
P1	Total likes / total number of posts	Average number of likes per post
P2	(P1 / number of followers) × 1000	Average number of likes post per 1000
Commitment		
C1	Total comments / total number of posts	Average number of comments per post
C2	(C1 / number of followers) × 1000	Average number of comments post per 1000
Virality		
V1	Total shares / total number of posts	Average number of shares per post
V2	(V1 / number of followers) × 1000	Average number of shares post per 1000

Resource: adopted from Bonsón and Ratkai, 2013a,b; Bonsón et al., 2016.

the total number of posts. The same calculation was made for the comments *(C1)* and shares *(V1)*. After deriving *P1, C1, and V1,* the *average number of likes post per 1000 (P2), the average number of comments per 1000 (C2),* and the *average number of share per 1000 (V3)* were calculated. *P2* was calculated by dividing the *P2* and the number of followers and then multiplying the value by 1000. This mitigates the instances that engagement rates may be affected by the difference in the number of followers for different companies. The same calculation was made for comments *(C2)* and shares *(V2)*. Lastly, the stakeholder engagement rate was derived by summing up the values of *P2, C2,* and *V2*.

4. Results and discussion

In hierarchical regression, predictors are chosen based on previous work and the researchers would decide the order in which the predictors are entered into the model. The known predictors in order of their importance in predicting the outcome go first. Once the known predictors have been added, new predictors can be added to the model either all at one go or in a stepwise manner (hierarchically) (Field, 2013).

Specifically, hierarchical regression modelling is used in this study to test the complementarity of the three theories used, such that each theory can improve the explanatory power of stakeholder engagement. It involves a systematic, stepwise entry of the independent variables into the regression model.

To systematically test the hypotheses in this work, three models were expanded. Consequently, the models' statistical equations are,

$$\text{Model 1 : Stakeholder Engagement} = b_0 + b_i\text{UGT}_i + e_i \; i = 1, \ldots, 431 \quad (1)$$

$$\text{Model 2 : Stakeholder Engagement} = b_0 + b_i\text{UGT}_i + b_{ii}\text{MRT}_i + e_i \; i = 1, \ldots, 431 \quad (2)$$

$$\text{Model 3 : Stakeholder Engagement} = b_0 + b_i\text{UGT}_i + b_{ii}\text{MRT}_i + b_{iii}\text{PMT}_i + ei \; i = 1, \ldots, 431 \quad (3)$$

where subscript i represents the *ith* observation, b_0 is the regression constant, b_i, b_{ii} and b_{iii} is the regression coefficient and e is the residual,

$$\text{UGT}_i = [\text{`Celebratory'`Company'`CSR'`CTA'`Entertaining'`Relational'}]$$

$$\text{MRT}_i = [\text{`Vividness'`External link'`Hashtag'`Word length'}]$$

$$\text{PMT}_i = [\text{`Self} - \text{efficacy'`Response efficacy'`Severity'`Vulnerability'}]$$

The purpose of Model 1 seeks to understand a user's motivations to use SM based on their needs for different types of content. It comprises variables that are included in the UGT framework, where informational content included 'Celebratory', 'Company', 'CSR', and 'CTA', and the remaining are 'Entertaining' and 'Relational' content. These are reflected by H_{1a}, H_{1b}, H_{1c}, H_{1d}, H_2, and H_3.

Model 2 extends Model 1 by including an additional four core variables that influence the fluency of the message, as explained by the concept of the MRT. These variables in MRT consist of 'Vividness', 'Hashtags', 'External links', and 'Word length' which is reflected by H_4, H_5, H_6, and H_7.

Finally, Model 3 extends Model 2 by including four PMT variables, 'Self-efficacy', 'Response efficacy', 'Severity', and 'Vulnerability' which will assess the role of negative and positive appeal messages leading to stakeholder engagement in a crisis event such as the COVID-19 pandemic. The purpose of Model 3 is to test the hypothesis; H_{8a}, H_{8b}, H_{9a}, and H_{9b}.

Table 5 presents the results generated by the hierarchical regression analysis. Model 1 shows that the UGT variables accounted for 11 % $(R^2 = 0.112)$ of the variance in the stakeholder engagement rate. Comparing Model 1 and Model 2, whereby the former is nested in the latter, the inclusion of the MRT variables 'Vividness', 'Hashtags', 'External links', and 'Word length' significantly increases the explained variance of the stakeholder engagement ($\Delta F = 7.022, p < 0.01$). Therefore, Model 2 is accepted. Collectively, the variables of Model 2 accounted for 17 % ($R^2 = 0.168$) of the variance in the stakeholder engagement rate. Similarly, the inclusion of PMT variables of 'Self-efficacy', 'Response efficacy', 'Severity', and 'Vulnerability' significantly increase the explained variance of the stakeholder engagement ($\Delta F = 5.367, p < 0.01$). Hence, we finally arrive at Model 3 being the best. The addition of the four PMT variables in Model 3 increases the R^2 of stakeholder engagement by 0.04 to 0.209. The change in F-value (ΔF) is significant ($p < 0.00$) which indicates a significant increase in the explained variance of the stakeholder engagement.

The R^2 value for all three models 1, 2, and 3 are found to be 0.112, 0.168, and 0.209 respectively, which indicates an overall "medium" effect size towards stakeholder engagement in the field of Social Sciences. According to Cohen (1992), where the power of a statistical test was examined by the effect size based on the derived R^2 value, he suggested that the R^2 values of 0.02, 0.13 and 0.26 indicates small, medium and large effect sizes respectively. Hence, applying Cohen's standard of interpretation, the R^2 value of 0.209 indicates a medium effect size which is an acceptable effect size in the research field of behavioural sciences.

According to Table 5, on the effects of the UGT variables in Model 1, 'Celebratory' ($b_1 = 0.173, p < 0.05$), 'Company' ($b_2 = 0.231, p < 0.05$), 'CTA' ($b_4 = 0.234, p < 0.05$) and 'Relational' ($b_6 = 0.229, p < 0.05$) variables were positive and have a significant effect on stakeholder engagement. Hence H_{1a}, H_{1b}, H_{1d}, and H_3 are accepted. 'CSR' ($b_3 = 0.046, p > 0.05$) and 'Entertaining' ($b_5 = 0.051, p > 0.05$) variables are positive but had no significant effect on stakeholder engagement. Hence H_{1c} and H_2 are rejected.

The findings demonstrated that higher stakeholder engagement via SM is affected by most factors under UGT. Informational content relating to 'Celebratory', 'Company', 'CSR', and providing 'CTA' content led to higher stakeholder engagement rates. 'Relational' content also influenced higher stakeholder engagement rates. Since three out of four of the components of informational content, excluding 'CSR', had a positive influence on engagement, it illustrates that informational and relational content types do have a stronger influence on stakeholder engagement, which is consistent with the findings of Dolan et al. (2015) which states that resourceful or helpful information and interactive content are key gratifications for users seeking to consume media services.

Under the UGT, both 'CSR' and 'Entertaining' content did not have a

Table 5
Hierarchical regression analysis using stakeholder engagement rate as an outcome criterion.

	Model 1		Model 2		Model 3		Hypothesis
	UGT		MRT		PMT		
Variables (i)	b_i	Sig.	b_i	Sig.	b_i	Sig.	
Celebratory	0.173	0.003	0.163	0.005	0.182	0.002	H_{1a} accepted
Company	0.231	0.002	0.213	0.003	0.028	0.004	H_{1b} accepted
CSR	0.046	0.493	0.052	0.421	0.111	0.093	H_{1c} rejected
CTA	0.234	0.000	0.121	0.033	0.109	0.050	H_{1d} accepted
Entertaining	0.051	0.400	0.063	0.285	0.077	0.189	H_2 rejected
Relational	0.229	0.001	0.219	0.001	0.239	0.004	H_3 accepted
Vividness			0.162	0.000	0.187	0.000	H_4 accepted
Hashtag			0.058	0.203	0.036	0.428	H_5 rejected
External Link			0.204	0.000	0.211	0.000	H_6 accepted
Word length			−0.033	0.473	−0.28	0.534	H_7 rejected
Self-efficacy					0.2885	0.001	H_{8a} accepted
Response efficacy					−0.028	0.670	H_{8b} rejected
Severity					0.13	0.016	H_{9a} accepted
Vulnerability					0.281	0.000	H_{9b} accepted
Model's summary statistics							
ΔF		8.939		7.022		5.367	
Sig. of ΔF		0.000		0.000		0.000	
R^2		0.112		0.168		0.209	
ΔR^2		0.112		0.056		0.041	

significant effect on engagement rates. The result for entertaining content contradicts Bazi et al. (2020) and Yu (2014) who state that entertaining content can lead to engagement behaviour. One possible reason for the difference could be due to the current SM landscape, where companies are constantly adding new entertaining content, and audiences are forced to adapt quickly. Given the considerable time that audiences spend online, particularly during the pandemic, the influx of new 'entertaining' content can cause 'content overload' or feelings of being overwhelmed known as SM exhaustion which leads to desensitization and usage discontinuance (Bossio and Holton, 2019; Fu et al., 2020). Another possible reason could be that entertainment value is often a subjective opinion that depends on individual preferences and the company's ability to create quality content with high entertainment value. Meanwhile, the lack of stakeholder engagement towards 'CSR' posts could be explained by the current plethora of CSR claims by companies which contradicts the incidents of organisation misconduct within the maritime sector. Hence, stakeholders could become doubtful of the extent to which companies can live up to their claims, resulting in skepticism towards their CSR initiatives (Skarmeas and Leonidou, 2013).

Regarding the effects of MRT variables in Model 2, 'Vividness' ($b_1 = 0.162, p < 0.05$) and 'External links' ($b_2 = 0.204, p < 0.05$), are positive and significant. Hence H_4 and H_6 are accepted. However, the effect of 'Hashtag' ($b_3 = 0.058, p > 0.05$) is insignificant and 'Word length' ($b_4 = -0.033, p > 0.05$) is insignificant and negative. Hence H5 and H_7 are rejected.

The findings revealed that both higher levels of 'Vividness' and the presence of 'External links' significantly influence stakeholder engagement. The results of 'Vividness' is well supported by Viglia et al. (2018) and McShane et al. (2019), which suggest that higher levels of vividness aid in the conveyance of the intended message. Additionally, the findings from Surucu-Balci et al. (2020) also support that 'External links' have provided greater fluency of message, which leads to higher levels of stakeholder engagement.

However, other variables such as 'Hashtag' and 'Word length' did not have a significant influence on stakeholder engagement. The case for 'Hashtag' was explained by Pancer and Poole (2016), wherein the usage of hashtags may result in an opposite effect towards engagement as hashtags reduce visual clarity, which requires more effort to translate the symbols. Parallel to this argument, McShane et al. (2019) explained that hashtags and difficulty in the text decrease engagement. Similarly, 'Word length' yielded insignificant results. This contrasts with De Luca et al. (2022) who found word length influences the likes, comments, and shares garnered on SM. There could be several explanations for this discrepancy. Firstly, words have different definitions with varying levels of complexity. Moreover, the usage of overly complicated or abstract words is frowned upon in communications (Akin, 2020). Secondly, the level of clarity is affected by its structural organisation. Lastly, the meanings and interpretations can be impacted by various human factors including context, tone, and intention (Kreidler, 2002).

The effects of the three PMT variables from Model 3, 'Self-efficacy' ($b_1 = 0.289, p < 0.05$), 'Severity' ($b_3 = 0.13, p < 0.05$) and 'Vulnerability' ($b_4 = 0.281, p < 0.05$) are positive and significant. Hence H_{8a}, H_{9a}, and H_{9b} are accepted. However, 'Response efficacy' ($b_2 = -0.028, p > 0.05$) is tested insignificant and negative hence, H_{8b} is rejected. The results support this study's argument which suggests that posts with higher levels of 'Self-efficacy', 'Severity', and 'Vulnerability', do positively influence stakeholder engagement. This is consistent with the findings that negative appeal messages are effective in inducing stakeholder engagement due to negative emotional arousal by increasing stakeholders' appraisal of threats (Zheng, 2020). 'Self-efficacy' content types were found to have a positive and significant effect on engagement. This is supported by existing literature which affirmed that a positive appeal message increases stakeholder engagement due to positive emotional arousal through the increase of the coping appraisal of the threat (Casais and Proença, 2021).

On the contrary, the 'response efficacy' eliciting content types was found to have an insignificant effect on stakeholder engagement. This result could be a reflection of the public's current sentiment towards COVID-19 protective measures. Such sentiments are associated with skepticism towards the effectiveness of these protective measures. Whether the sentiments are positive or negative depends on the individual government's level of response actions and may vary in intensity during different periods. Generally, the public in some Asian countries, such as Singapore, India, and South Korea, had more positive responses towards these protective measures (Lwin et al., 2022). However, in western countries adherence to COVID-19 protective measures has been met with skepticism, even causing panic in situations such as public authorities discouraging the use of masks and PPE (Nguyen et al., 2020). Furthermore, countries within the European Union have accelerated their moves to exit the pandemic with the removal of restrictions and 'unmasking' as the people's frustrations continue to grow (Eurobarometer, 2022). Similar sentiments were echoed in America, where the support for vaccine mandates has dropped from 43 % to 53 %, and

mask-wearing and social distancing have dropped from 52 % to 63 % (Monmouth University, 2022). Such negative sentiments could also be aroused by the publics' knowledge of protective measures, in the case of mRNA vaccines, a "fully vaccinated" reduces infection by 25 %, but infections and reinfection are still possible (Abraham, 2022; CDC, 2022).

5. Conclusions

With the addition of PMT, this study extends the knowledge of stakeholder engagement in the UGT and MRT literature. It bridges the knowledge gap between the types of SM content that appeal to stakeholders during a pandemic versus a usual business context. This is done by determining the effects of positive and negative appeal messages on SM stakeholder engagement as defined by PMT's coping and threat appraisal constructs. Currently, few studies have examined the stakeholder engagement rates of SM content for COVID-19 crisis management. As a result, the majority of these studies have focused on the usage of conventional communications theories such as UGT and MRT to influence higher stakeholder engagement rates. Thus, the current study adds perspective by incorporating Protection Motivational constructs to examine their effects on stakeholder engagement. Hence, the combination of the three theories provides a more comprehensive evaluation of the content types and characteristics of SM posts affecting stakeholder engagement in a pandemic.

Another significant contribution of this study is attributed to the employment of a range of theories from different fields of study such as communications and health behavioural sciences, which gives a more in-depth analysis of content appeal in COVID-19 crisis management. The combination of these complementing theories of UGT, MRT, and PMT constructs was able to determine the effects of informational, entertaining, relational, self-efficacy, response efficacy, severity, vulnerability, vividness, hashtags, word length, and external links on stakeholder engagement rates. These variables contribute to a medium effect size towards stakeholder engagement ($R^2 = 0.209$) which is considerable in the context of behavioural sciences (Cohen, 1992). This result implies that the employment of these theories successfully improved the explanatory power of stakeholder engagement as opposed to the use of traditional communications theory used in the existing literature. Moreover, the results show the complementary relationship between the three theories as a total of nine out of fourteen variables yielded significant results.

This paper also provides managerial implications for various organisations within the maritime industry during the current global pandemic. As aforementioned, the benefits of using mainstream SM platforms particularly Facebook for stakeholder engagement are unparalleled. However, these benefits could only be realised if the SM posts can gather substantial stakeholder engagement. As such, this paper enables managers to determine what kinds of SM content and the characteristics of the posts would lead to higher stakeholder engagement in a pandemic, to maximise the potential benefits of SM as a management tool that allows for faster crisis recovery or even mitigate the negative effects of future crisis disruptions.

First, the findings from the results show that certain content types under the UGT have a significantly stronger influence on stakeholder engagement. Such contents include relational and informational content consisting of celebratory news, company news, and offering additional information with the use of CTA. Hence, to raise stakeholder engagement and thereby the visibility of SM posts, it is recommended that organisations should create more informational posts regarding their management and the developments of the pandemic. Other forms of informational posts include celebratory news of their milestones and achievements during the pandemic. Additionally, the use of a direct CTA which provides users with additional informational sources would also enhance the engagement of stakeholders. It is also suggested that organisations should create more relational content to increase stakeholder engagement, as relational content can provide higher levels of interactivity and emotional support, which is currently lacking due to the erosion of people's social fabric and increased isolation during this pandemic.

An organisation's ability to provide unequivocal, concise, and consistent messaging in the case of communications and management is vital. Thus, the strategic use of media presenting higher degrees of vividness such as videos and gifs could significantly improve stakeholder engagement. With regards to the fluency of the message, the incorporation of external links embedded in a post would also significantly provide better fluency and hence generate higher stakeholder engagement.

Additionally, content types under the PMT consisting of posts that elicit self-efficacy, severity, and vulnerability were found to significantly affect stakeholder engagement. This study provides a list of recommended keywords (Table 3), that organisations should incorporate into their communications when constructing messages relating to coping and threat appraisal messages to increase stakeholder engagement. The use of such keywords raises both the threat and coping appraisal by individual stakeholders due to the respective negative and positive appeals towards the situation of the pandemic.

Finally, this study highlights certain types of content that managers should be more mindful of or rather avoid, due to the lack of significant influence on stakeholder engagement rates. Firstly, the excessive posting of information about CSR news relating to COVID-19 could be minimised considering its proliferation in the current SM landscape, as it can arouse the skepticism of intentions among stakeholders. Second, although the use of content with higher vividness is encouraged, organisations should be wary of the excessive use of it and also ensure the focus on the content quality and meaningful entertaining content rather than content for the sole purpose of entertainment. Hashtags should be used only when necessary as it does not show a significant effect on engagement rates. Rather than focussing on the reduction of the word length of posts, organisations should focus on ensuring clarity and coherence of their posts with the right use of words and proper structuring of their messages. Lastly, in spite of the positive emotional appeal of response efficacy eliciting messages, any further incentivization and promotion of COVID-19 protective measures should be minimised, as it does not raise coping appraisal of stakeholders perhaps due to the ongoing conflict with regards to public sentiments view on efficacies of these recommended protective measures, which often differ based on the geographical and situational context.

There are several limitations to this study. First, these findings may not be applicable to all types of crisis events, as the results may differ based on the severity of each crisis. For a similar reason, the results may also differ across industries as the impacts of COVID-19 disruptions on each industry may differ significantly. This is because, the varying impacts of the disruption, can affect the types of content that arouse the appeal of stakeholders as a result of the different degrees of perceived coping and threat appraisal. The reasons behind such conclusions are because the sampled organisations in this analysis are based on only maritime organisations that are heavily impacted by COVID-19 disruptions, and the Facebook posts were filtered according to only COVID-19-related posts. Moreover, the list of recommended keywords under response efficacy identified in Table 3 (i.e. 'Masks'), are related to COVID-19 protective measures. Therefore, these assumptions require further investigation.

Another limitation of this paper is that the results were collected from 1st January 2020 to 31st July 2021. Naturally, some of the posts were posted during the early phases of the pandemic when people's fear and anxiety about the virus were high. As a result, the lower perceived threat of the currently stabilised condition of COVID-19, the level of engagement with COVID-19 content posted in recent times may differ.

Finally, the results in this study were limited to a single platform – Facebook. While the numbers of B2B organisations utilizing LinkedIn for SM engagement of stakeholders continue to increase, a future study could examine the same organisations on LinkedIn posts and compare

them against the results from Facebook or other SM platforms.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgement

This research is supported by the Ministry of Education, Singapore, under its Academic Research Fund Tier 1 (Project ID, RS03/19).

References

Abraham, B.K.B., 2022. COVID cases surpass 400 million as Omicron grips world.
Akin, K., 2020. A Leader'sGuide: Communicating With Teams, Stakeholders, and Communities During COVID-19.
Alphaliner, 2021. Alphaliner Top 100.
Austin, L., Jin, Y., 2016. Social media and crisis communication: Explicating the social-mediated crisis communication model.
Bandura, A., 1977. Self-efficacy: toward a unifying theory of behavioral change. Psychol. Rev. 84 (2), 191–215.
Bazi, S., Filieri, R., Gorton, M., 2020. Customers' motivation to engage with luxury brands on social media. J. Bus. Res. 112, 223–235.
Bermes, A., 2021. Information overload and fake news sharing: a transactional stress perspective exploring the mitigating role of consumers' resilience during COVID-19. J. Retail. Consum. Serv. 61, 102555.
Bonsón, E., Bednárová, M., Wei, S., 2016. Corporate twitter use and stakeholder engagement: an empirical analysis of the Spanish hotel industry. Eur. J. Tour. Res. 13, 69–83.
Bonsón, E., Ratkai, M., 2013a. A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page. Online Inf. Rev. 37 (5), 787–803.
Bonsón, E., Ratkai, M., 2013. A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page. Online information review.
Bossio, D., Holton, A.E., 2019. Burning out and turning off: journalists' disconnection strategies on social media. Journalism 22 (10), 2475–2492.
Bozkurt, S., Gligor, D.M., Babin, B.J., 2021. The role of perceived firm social media interactivity in facilitating customer engagement behaviors. Eur. J. Mark. 55 (4), 995–1022.
Brodie, R.J., Hollebeek, L.D., Jurić, B., Ilić, A., 2011. Customer engagement: conceptual domain, fundamental propositions, and implications for research. J. Serv. Res. 14 (3), 252–271.
Bundy, J., Pfarrer, M.D., Short, C.E., Timothy Coombs, W., 2017. Crises and crisis management: Integration, interpretation, and research development. J. Manag. 43 (6), 1661–1692.
Carlson, J., Rahman, M.M., Voola, R., Vries, N.J.D., 2018. Customer engagement behaviours in social media: capturing innovation opportunities. Journal of Services Marketing 32, 83–94.
Cartaxo, A.N.S., Barbosa, F.I.C., de Souza Bermejo, P.H., Moreira, M.F., Prata, D.N., 2021. The exposure risk to COVID-19 in most affected countries: a vulnerability assessment model. PLOS ONE 16 (3), e0248075.
Casais, B., Proença, J.F., 2021. The use of positive and negative appeals in social advertising: a content analysis of television ads for preventing HIV/AIDS. Int. Rev. Public Nonprofit Mark 19, 623–647.
CDC, 2022. Clinical Characteristics and Outcomes Among Adults Hospitalized With Laboratory-Confirmed SARS-CoV-2 Infection During Periods of B.1.617.2 (Delta) and B.1.1.529 (Omicron) Variant Predominance.
Celuch, K., 2021. Hashtag usage and user engagement on Instagram: the case of# foodfestivals. J. Phys. Educ. Sport 21, 966–973.
Coelho, C.M., Suttiwan, P., Arato, N., Zsido, A.N., 2020. On the nature of fear and anxiety triggered by COVID-19. Front. Psychol. 11.
Cohen, J., 1992. A power primer. Psychol. Bull. 112 (1), 155–159.
Daft, R.L., Lengel, R.H., Trevino, L.K., 1987. Message equivocality, media selection, and manager performance: implications for information systems. MIS Q. 11 (3), 355–366.
De Beukelaer, C., 2021. COVID-19 border closures cause humanitarian crew change crisis at sea. Mar. Policy 132, 104661-104661.
De Luca, F., Iaia, L., Mehmood, A., Vrontis, D., 2022. Corrigendum to "Can social media improve stakeholder engagement and communication of sustainable development Goals? A cross-country analysis". Technol. Forecast. Soc. Chang. 182, 121853.
De Waele, A., Claeys, A.-S., Cauberghe, V., 2017. The organizational voice: the importance of voice pitch and speech rate in organizational crisis communication. Commun. Res. 46 (7), 1026–1049.
Denktaş-Şakar, G., Sürücü, E., 2020. Stakeholder engagement via social media: an analysis of third-party logistics companies. Serv. Ind. J. 40 (11–12), 866–889.
Dodson, I., 2016. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns. John Wiley & Sons.
Dolan, R., Conduit, J., Fahy, J., Goodman, S., 2015. Social media engagement behaviour: a uses and gratifications perspective. J. Strateg. Mark. 24.
Dolan, R., Conduit, J., Fahy, J., Goodman, S., 2016. Social media engagement behaviour: a uses and gratifications perspective. J. Strateg. Mark. 24 (3–4), 261–277.
Eigenraam, A.W., Eelen, J., Van Lin, A., Verlegh, P.W., 2018. A consumer-based taxonomy of digital customer engagement practices. J. Interact. Mark. 44, 102–121.
Eurobarometer, 2022. Public opinion in the EU in time of coronavirus crisis.
Field, A., 2013. Discovering Statistics Using IBM SPSS Statistics. Sage.
Fortin, D., Dholakia, R., 2005. Interactivity and vividness effects on social presence and involvement with a web-based advertisement. J. Bus. Res. 58, 387–396.
Fox, S., 2011. The social life of health information, 2011. California Healthcare Foundation.
Fraustino, J.D., Liu, Brooke, Jin, Yan, 2012. Social Media Use During Disasters: A Review of the Knowledge Base and Gaps.
Fredrickson, B.L., 2001. The role of positive emotions in positive psychology. The broaden-and-build theory of positive emotions. Am. Psychol. 56 (3), 218–226.
Fu, S., Li, H., Liu, Y., Pirkkalainen, H., Salo, M., 2020. Social media overload, exhaustion, and use discontinuance: examining the effects of information overload, system feature overload, and social overload. Inf. Process. Manag. 57 (6), 102307.
Harrigan, P., Evers, U., Miles, M., Daly, T., 2017. Customer engagement with tourism social media brands. Tour. Manag. 59, 597–609.
Hays, S., Page, S., Buhalis, D., 2012. Social media as a destination marketing tool: its use by National Tourism Organizations. Curr. Issue Tour. 16, 1–29.
HellenicShipping, 2021. Benchmark Study Ranks Top Performers in Dry Bulk.
Hollebeek, L.D., Glynn, M.S., Brodie, R.J., 2014. Consumer brand engagement in social media: conceptualization, scale development and validation. J. Interact. Mark. 28 (2), 149–165.
Hollebeek, L.D., Sharma, T.G., Pandey, R., Sanyal, P., Clark, M.K., 2021. Fifteen years of customer engagement research: a bibliometric and network analysis. J. Prod. Brand. 31 (2), 293–309.
Holmes, Whitney, S.E., 2011. Crisis Communications and Social Media: Advantages, Disadvantages and Best Practices.
Hopkins, J., 2021. COVID-19 Dashboard by the Centre for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU).
Hsieh, Y., Chen, Y.-L., Wang, Y.-C., 2021. Government and social trust vs. hotel response efficacy: a protection motivation perspective on hotel stay intention during the COVID-19 pandemic. Int. J. Hosp. Manag. 97, 102991.
Kang, K., Lu, J., Guo, L., Li, W., 2021. The dynamic effect of interactivity on customer engagement behavior through tie strength: evidence from live streaming commerce platforms. Int. J. Inf. Manag. 56, 102251.
Klassen, K.M., Borleis, E.S., Brennan, L., Reid, M., McCaffrey, T.A., Lim, M.S., 2018. What people "like": analysis of social media strategies used by food industry brands, lifestyle brands, and health promotion organizations on Facebook and Instagram. J. Med. Internet Res. 20 (6), e10227.
Kreidler, C., 2002. Introducing English Semantics. Routledge.
Kusumasondjaja, S., 2018. The roles of message appeals and orientation on social media brand communication effectiveness: an evidence from Indonesia. Asia Pac. J. Mark. Logist. 30.
Laguna, L., Fiszman, S., Puerta, P., Chaya, C., Tárrega, A., 2020. The impact of COVID-19 lockdown on food priorities. Results from a preliminary study using social media and an online survey with Spanish consumers. Food Qual. Prefer. 86, 104028.
Latkin, C.A., Dayton, L., Davey-Rothwell, M.A., Tobin, K.E., 2019. Fentanyl and drug overdose: perceptions of fentanyl risk, overdose risk behaviors, and opportunities for intervention among people who use opioids in Baltimore, USA. Subst. Use Misuse 54 (6), 998–1006.
Leek, S., Houghton, D., Canning, L., 2019. Twitter and behavioral engagement in the healthcare sector: an examination of product and service companies. Ind. Mark. Manag. 81, 115–129.
Leighton, N., 2021. Top Five Social Media Platforms For Business Leaders.
Lloyd'sList, 2021. One Hundred Ports 2021.
Lloyd'sList, 2021. Top Shipmanagers.
López, C., Hartmann, P., Apaolaza, V., 2017. Gratifications on social networking sites: the role of secondary school students' individual differences in loneliness. J. Educ. Comput. Res. 57 (1), 58–82.
Lwin, M.O., Sheldenkar, A., Lu, J., Schulz, P.J., Shin, W., Panchapakesan, C., Gupta, R.K., Yang, Y., 2022. The evolution of public sentiments during the COVID-19 pandemic: case comparisons of India, Singapore, South Korea, the United Kingdom, and the United States. JMIR Infodemiol. 2 (1), e31473.
Mainolfi, G., Lo Presti, L., Marino, V., Filieri, R., 2022. "YOU POST, I TRAVEL". Bloggers' credibility, digital engagement, and travelers' behavioral intention: the mediating role of hedonic and utilitarian motivations. Psychol. Mark. 39 (5), 1022–1034.
Mair, J., Ritchie, B.W., Walters, G., 2016. Towards a research agenda for post-disaster and post-crisis recovery strategies for tourist destinations: a narrative review. Curr. Issue Tour. 19 (1), 1–26.
Mayer, R.E., 2002. Multimedia learning. In: Psychology of learning and motivation. Elsevier, pp. 85–139.
McShane, L., Pancer, E., Poole, M., 2019. The influence of B to B social media message features on brand engagement: a fluency perspective. J. Bus. Bus. Mark. 26, 1–18.
Meire, M., Hewett, K., Ballings, M., Kumar, V., Van den Poel, D., 2019. The role of marketer-generated content in customer engagement marketing. J. Mark. 83 (6), 21–42.
Mensa, M., Vargas-Bianchi, L., 2020. Nurtured and sorrowful: Positive and negative emotional appeals in COVID-19 themed brand communications.
Monmouth University, 2022. Time to Accept Covid and Move On?.

Nguyen, T.T.P., Nguyen, L.H., Le, H.T., Vu, G.T., Hoang, M.T., Nguyen, D.N., Le, X.T.T., Tran, B.X., Nguyen, T.T., Pham, Q.T., Ta, N.T.K., Nguyen, Q.T., Latkin, C.A., Ho, R.C. M., Ho, C.S.H., 2020. Perceptions and attitudes toward COVID-19-related national response measures of Vietnamese: implications for pandemic prevention and control. Frontiers in Public Health 8.
Oakley, M., Mohun Himmelweit, S., Leinster, P., Casado, M.R., 2020. Protection motivation theory: a proposed theoretical extension and moving beyond rationality—the case of flooding. Water 12 (7), 1848.
Onofrei, G., Filieri, R., Kennedy, L., 2022. Social media interactions, purchase intention, and behavioural engagement: the mediating role of source and content factors. J. Bus. Res. 142, 100–112.
Oxford, 2022. Definition of crisis noun from the Oxford Advanced Learner's Dictionary.
Pancer, E., Poole, M., 2016. The popularity and virality of political social media: hashtags, mentions, and links predict likes and retweets of 2016 U.S. Presidential nominees' tweets. Soc. Influ. 11 (4), 259–270.
Raacke, J., Bonds-Raacke, J., 2008. MySpace and Facebook: applying the uses and gratifications theory to exploring friend-networking sites. CyberPsychol. Behav. 11 (2), 169–174.
Rietveld, R., Van Dolen, W., Mazloom, M., Worring, M., 2020. What you feel, is what you like influence of message appeals on customer engagement on instagram. J. Interact. Mark. 49, 20–53.
Ritchie, B.W., Jiang, Y., 2019. A review of research on tourism risk, crisis and disaster management: launching the annals of tourism research curated collection on tourism risk, crisis and disaster management. Ann. Tour. Res. 79, 102812.
Rogers, R.W., 1975. A protection motivation theory of fear appeals and attitude change1. J. Psychol. 91 (1), 93–114.
Sabzmakan, L., Ghasemi, M., Asghari Jafarabadi, M., Kamalikhah, T., Chaleshgar Kordasiabi, M., 2018. Factors associated with tobacco use among Iranian adolescents: an application of protection motivation theory. Subst. Use Misuse 53 (9), 1511–1518.
Schreiner, M., Fischer, T., Riedl, R., 2021. Impact of content characteristics and emotion on behavioral engagement in social media: literature review and research agenda. Electron. Commer. Res. 21 (2), 329–345.
Skarmeas, D., Leonidou, C.N., 2013. When consumers doubt, watch out! The role of CSR skepticism. J. Bus. Res. 66 (10), 1831–1838.
Stelzner , 2018.
Stieglitz, S., Dang-Xuan, L., 2013. Emotions and information diffusion in social media—sentiment of microblogs and sharing behavior. J. Manag. Inf. Syst. 29 (4), 217–248.
Surucu-Balci, E., Balci, G., Yuen, K.F., 2020. Social media engagement of stakeholders: a decision tree approach in container shipping. Comput. Ind. 115, 103152.
Sutter, J., 2010. Texts, maps battle Haiti cholera outbreak. Retrieved October 31, 2010.
Tafesse, W., 2016. An experiential model of consumer engagement in social media. J. Prod. Brand. Manag. 25 (5), 424–434.
Taylor, D.G., Lewin, J.E., Strutton, D., 2011. Friends, fans, and followers: do ads work on social networks? J. Advert. Res. 51 (1), 258.
Tiago, T., Couto, J.P., Tiago, F., Faria, S.D., 2017. From comments to hashtags strategies: enhancing cruise communication in Facebook and twitter. Tourismos 12 (3).
Ting, D.H., Abbasi, A.Z., Ahmed, S., 2021. Examining the mediating role of social interactivity between customer engagement and brand loyalty. Asia Pac. J. Mark. Logist. 33 (5), 1139–1158.
UNCTAD, 2021. COVID-19 and maritime transport: Impact and responses.
UNCTAD, 2021. Shipping during COVID-19: Why container freight rates have surged.
Utami, A.F., Ekaputra, I.A., Japutra, A., Van Doorn, S., 2022. The role of interactivity on customer engagement in mobile e-commerce applications. Int. J. Mark. Res. 64 (2), 269–291.
Van Nguyen, D., Nguyen, P.-H., 2022. Social media and COVID-19 vaccination hesitancy: mediating role of the COVID-19 vaccine perception. Heliyon 8 (9), e10575.
Vazquez, E.E., 2020. Effects of enduring involvement and perceived content vividness on digital engagement. J. Res. Interact. Mark. 14 (1), 1–16.
Viglia, G., Pera, R., Bigné, E., 2018. The determinants of stakeholder engagement in digital platforms. J. Bus. Res. 89, 404–410.
Wagner, T.F., Baccarella, C.V., Voigt, K.-I., 2017. Framing social media communication: investigating the effects of brand post appeals on user interaction. Eur. Manag. J. 35 (5), 606–616.
WHO, 2020. COVID-19 Transmission and Protective Measures.
WHO, 2022. Coronavirus Disease (COVID-19).
Yang, M., Ren, Y., Adomavicius, G., 2019. Understanding user-generated content and customer engagement on Facebook business pages. Inf. Syst. Res. 30 (3), 839–855.
Yousaf, A., Amin, I., Jaziri, D., Mishra, A., 2021. Effect of message orientation/vividness on consumer engagement for travel brands on social networking sites. J. Prod. Brand. Manag. 30 (1), 44–57.
Yu, J., 2014. We look for social, not promotion: brand post strategy, consumer emotions, and engagement. Int. J. MediaCommun. 1 (2), 28–37.
Zheng, M., 2020. When and why negative emotional appeals work in advertising: a review of research. Open J. Soc. Sci. 08, 7–16.

Le Yi Koh is currently a Ph.D. student at the School of Civil and Environmental Engineering, Nanyang Technological University, Singapore. Her research interest is on the interface between knowledge and technology management.

Chloe Ng is an undergraduate from Maritime Studies, Nanyang Technological University, Singapore. Her research interest is on maritime studies and crisis management.

Xueqin Wang is currently Assistant Professor at Chung-Ang University, South Korea. She received her Bachelor of Science (Maritime Studies) degree and Doctor of Philosophy degree from NTU in Jun-2014 and Sep-2018 respectively. Her research interests are in consumers' participatory behaviours in last-mile logistics from a value co-creation perspective. Her research works can be found in Journal of Service Theory and practice, Journal of Retailing and Consumer Services, and International Journal of Physical Distribution and Logistics Management.

Kum Fai Yuen is currently Assistant Professor and Programme Director of MSc (Maritime Studies) at School of Civil and Environmental Engineering, Nanyang Technological University, Singapore. He is listed in the world's top 2 % most influential scientist by Stanford University. He is also the recipient of the Inauguration Grant 2019, an award under the Singapore Teaching and Academic Research Talent Scheme.

Currently, he is serving as Associate Editor for Frontiers in Marine Science (SCI), Maritime Policy & Management (SSCI) and Asian Journal of Shipping and Logistics (ESCI).

His research interests include maritime studies, supply chain management and logistics, maritime policy and management, sustainability, corporate social responsibility, last-mile delivery, shared transport and economy, and technology innovation management.